CLAIMS

1. An input device comprising:

a touch panel with which a user performs input operation of information by touching the touch panel;

a vibration generation device for feeding back, to the user, various kinds of sense of touch in accordance with the type of the information through the touch panel; and

a vibration control circuit for allowing the vibration generation device to generate various forms of vibrations in accordance with the type of the information,

the vibration generation device being a bimorph piezoelectric actuator including a first actuator unit and a second actuator unit stacked on the first actuator unit in which when one of the first and second actuator units expands, the other contracts,

each of the first and second actuator units having multi-layered piezoelectric element layer.

2. The input device according to claim 1, further comprising:

an image display unit that displays information, wherein

the user can perform the input operation of information by touching a portion on the touch panel corresponding to the position at which the information of the image display unit is displayed, and

the vibration generation device is disposed in the image display unit.

3. The input device according to claim 2, wherein electrodes are disposed on both sides of each of the piezoelectric element included in the first and second actuator units.

4. The input device according to claim 2, wherein the bimorph piezoelectric actuator includes: a first support portion disposed between one end portion of the bimorph piezoelectric actuator and image display unit; a second support portion disposed between the other end portion of the bimorph piezoelectric actuator and image display unit; and a third support portion disposed between the center of the bimorph piezoelectric actuator and touch panel.

5. The input device according to claim 4, wherein the first, second and third support portions have flexibility in the rotation direction different from the direction that the user touches the touch panel.

6. The input device according to claim 5, wherein each of the first and second support portions has a projection and soft adhesive for fixing the projection to the bimorph piezoelectric actuator and image display unit, and third support portion has a projection and soft adhesive for fixing the projection to the bimorph piezoelectric actuator and touch panel.

7. The input device according to claim 2, wherein the bimorph piezoelectric actuator includes a support portion disposed between one end portion of the bimorph piezoelectric actuator and image display unit and another support portion disposed

between the other end portion of the bimorph piezoelectric actuator and touch panel.

8. The input device according to claim 2, wherein the bimorph piezoelectric actuator includes support portions disposed between one end portion of the bimorph piezoelectric actuator and touch panel and between the other end portion of the bimorph piezoelectric actuator and touch panel, respectively.

9. The input device according to claim 8, wherein a spindle is fixed to the intermediate portion of the bimorph piezoelectric actuator.

10. The input device according to claim 2, wherein the image display unit is constituted by a liquid crystal display unit and has a dust seal that prevents dust from entering between the touch panel and liquid crystal display unit.

11. The input device according to claim 2, wherein the vibration control circuit stores a plurality of vibration control waveform patterns for the bimorph piezoelectric actuator, and the vibration control waveform patterns corresponds to the information items displayed on the image display unit.

12. The input device according to claim 11, wherein the vibration control waveform pattern stored in the vibration control circuit can be rewritten.

13. The input device according to claim 11, wherein the vibration generation device includes an electromotive force detection device that detects an electromotive force which is generated depending on the pressing force of the user and applied to the bimorph piezoelectric actuator.

14. An electronic apparatus having an input device for inputting information,

the input device comprising:

a touch panel with which a user performs input operation of information by touching the touch panel;

a vibration generation device for feeding back, to the user, various kinds of sense of touch in accordance with the type of the information through the touch panel; and

a vibration control circuit for allowing the vibration generation device to generate various forms of vibrations in accordance with the type of the information,

the vibration generation device being a bimorph piezoelectric actuator including a first actuator unit and a second actuator unit stacked on the first actuator unit in which when one of the first and second actuator units expands, the other contracts,

each of the first and second actuator units having multi-layered piezoelectric element layer.

15. The electronic apparatus according to claim 14, wherein

the input device further comprises an image display unit that displays information, the user can perform the input operation of information by touching a portion on the touch panel corresponding to the position at which the information of the image display unit is displayed, and the vibration generation device is disposed in the image display unit.

16. The electronic apparatus according to claim 15, wherein electrodes are

disposed on both sides of each of the piezoelectric element included in the first and second actuator units.

17. The electronic apparatus according to claim 14, wherein the electronic apparatus is a portable electronic apparatus.